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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/710,419

07/09/2004

Min-Lung Huang

11579-US-PA

4418

31561 7590 12/28/2006

JIANQ CHYUN INTELLECTUAL PROPERTY OFFICE  
7 FLOOR-1, NO. 100  
ROOSEVELT ROAD, SECTION 2  
TAIPEI, 100  
TAIWAN

EXAMINER

MAI, ANH D

ART UNIT

PAPER NUMBER

2814

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

12/28/2006

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/710,419	<b>Applicant(s)</b> HUANG, MIN-LUNG	
	<b>Examiner</b> Anh D. Mai	<b>Art Unit</b> 2814	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 15 November 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☐ Claim(s) 1-13 is/are pending in the application.  
     4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Continued Examination Under 37 CFR 1.114*

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October 11, 2006 has been entered.

### *Status of the Claims*

2. Amendment filed October 11, 2006 is acknowledged. Claim 23 has been cancelled. Claim 1 has been amended. Claim 23 has been added. Claims 1-13 and 23 are pending.

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 2-13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 2, recites: the structure of claim 1, wherein the **UBM layer** comprises: an adhesion layer....and **the bump**. (emphasis added).

It is well known that the UBM is the layer below (under) the bump, for it namesake.

If the UBM comprises the bump, then what is the layer above the UBM ?

Therefore, claims 2-13 are indefinite.

*Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-11 and 13 are rejected under 35 U.S.C. 102(e) as being anticipated by Lei (U.S. Patent No. 7,008,867).

With respect to claim 1, Lei, from Fig. 1D, teaches a wafer structure as claimed including:

a wafer (10) having a plurality of bonding pads (12), wherein the bonding pads (12) are disposed on an active surface of the wafer;

a first passivation layer (14) covering the active surface of the wafer (10), wherein the bonding pads (12) are not fully covered by the first passivation layer (14);

an under ball metallurgy (UBM) layer (16) disposed on each of the bonding pads (12), wherein the UBM layer comprises a first metallic layer (16A) and a second metallic layer (16B) disposed on the first metallic layer (16A), the first metallic layer (16A) covering a portion of the first passivation layer (14),

a second passivation layer (18) disposed on the first passivation layer (14), wherein the second metallic layer (16B) of the UBM layer does not cover the second passivation layer (18)

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the second passivation layer (18) covers a peripheral portion of the first metallic layer (16A), without covering the second metallic layer (16B); and

a plurality of bumps (22), disposed on the UBM layer (16).

With respect to claim 2, as best understood by the examiner, the UBM layer (16) of Lei comprises:

an adhesion layer, disposed on the bonding pad (12);

a barrier layer disposed on the adhesion layer;

a wetting layer disposed between the barrier layer and the bump (22). (See col. 3, line 10-col. 4, line 10).

With respect to claim 3, the adhesion layer of Lei is a single layer or comprises a plurality of layers.

With respect to claim 4, the barrier layer of Lei is a single layer or comprises a plurality of layers.

With respect to claim 5, the wetting layer of Lei is a single layer or comprises a plurality of layers.

With respect to claim 6, the first metallic layer (16A) of Lei includes the adhesion layer and the second metallic layer (16B) includes the barrier layer and the wetting layer.

With respect to claim 7, the first metallic layer (16A) of Lei includes the adhesion layer and the barrier layer and the second metallic layer (16B) includes the wetting layer.

With respect to claim 8, a material of the adhesion layer of Lei is titanium or aluminum.

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With respect to claim 9, a material of the barrier layer of Lei is selected from the group consisting of nickel-vanadium alloy, titanium nitride, tantalum nitride and nickel.

With respect to claim 10, a material of the wetting layer of Lei includes copper.

With respect to claim 11, a material of the second passivation layer (18) of Lei is benzocyclobutene (BCB) or polyimide (PI).

With respect to claim 13, the bumps (214) of Lei is a globular shapes or pillar shapes.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lei '867 as applied to claim 2 above, and further in view of Tseng et al. (U.S. Pub. No. 2003/0124832) of record.

Lei teaches the wafer structure as described in claim 2 above including the bump (22).

Thus, Lei is shown to teach all the features of the claim with the exception of explicitly utilizing material including tin/lead alloy for the bump.

However, Tseng teaches a similar wafer structure comprising conventional bump (30) utilizing tin/lead alloy. (See [0077]).

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Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention was made to form the bump of Lei utilizing material includes tin/lead for its low eutectic temperature.

***Response to Arguments***

6. Applicant's arguments with respect to amended claim 1 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anh D. Mai whose telephone number is (571) 272-1710. The examiner can normally be reached on 8:00AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
ANH D. MAI  
PRIMARY EXAMINER